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MULTIMEDIA COMPLIANCE INSPECTION REPORT

UNITED STATES STEEL CORPORATION – GARY WORKS
GARY, INDIANA

BY: Reza Bagherian
Brian Dickens
Shannon Downey
Gerald Golubski
Constantinos Loukeris
Monica Onyszko
Graciela Scambiaterra
Daniel Schaufelberger

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 5

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INTRODUCTION

At the request of the United States Environmental Protection Agency Region 5 (EPA), Enforcement Compliance Assistance Team (ECAT), the Air Enforcement and Compliance Assurance Branch (AECAB) of the Air and Radiation Division (ARD) coordinated a multimedia compliance investigation at the United States Steel Corporation – Gary Works (U.S. Steel or Gary Works) facility located in Gary, Indiana.

U.S. Steel owns and operates an integrated steel mill at One North Broadway, in Gary, Indiana (facility). The facility, North America's largest integrated steel mill, is located on nearly 4,000 acres, bounded to the North by Lake Michigan and to the South by the City of Gary. The Gary Works facility is comprised of both steelmaking operations and finishing facilities. The facility has a raw steelmaking capacity of approximately 8 million tons per year.

The USS Gary Works plant, constructed in 1906, employs about 5,200 workers and is operated 24 hours/day, 7-days per week, and 52 weeks per year. The Standard Industrial Classification (SIC) reported for the process operations performed at the facility is 3312 - Steel Works, Blast Furnaces (including Coke Ovens), and Rolling Mills.

Objective

The specific objectives of this multimedia inspection (MMI) were to evaluate compliance with:

- Air pollution control regulations under the Clean Air Act (CAA) and the Federally approved portions of the State of Indiana Air Pollution Implementation Plan;
- Hazardous waste management regulations under the Resource Conservation and Recovery Act (RCRA) and rules adopted under the State of Indiana's Hazardous Waste Program;
- Wastewater discharge requirements under the Clean Water Act (CWA); and
- Toxic Substances Control Act (TSCA) regulations for management of polychlorinated biphenyls (PCBs).

In addition, EPA inspectors attempted to identify plant activities that could impact the environment.

Personnel from the Indiana Department of Environmental Management (IDEM) participated in the CAA, RCRA, and TSCA/PCB portions of this investigation.

Investigation Methods

The investigation of the U.S. Steel Plant included:

- Review of regulatory files and

- On-site inspection of the facility, including:

  - discussions with plant personnel;
  - inspection of facility operations and pollution control equipment; and
  - and review of plant records and documents.

Background

1.) Process Overview

Coke Production Process

Metallurgical coke is manufactured on-site at the Gary Works facility. Coke is used at the facility's blast furnaces and sinter plant to reduce iron ore to iron. U.S. Steel owns and operates four coke oven batteries, which includes two six meter tall vertical flue batteries with 57 ovens each and two three meter short vertical flue batteries with 77 ovens each. The raw coal feedstock is crushed along with a percentage of petroleum coke (petcoke) at the facility's hammer mills. The hammer mills include eight coal units and one petcoke crusher. The processed coal/petcoke is then transported to the coke oven batteries and charged through ports at the top of coke ovens. The coal is heated in the ovens to approximately 2,000 degrees Fahrenheit for a period of 12 and 20 hours. Volatile coke oven gases (COG) are released from the coal and directed to the facility's coke by-product recovery plant where condensable materials (i.e., tars and light oils) are removed from the COG. The COG is then directed to the facility's desulfurization facility to remove hydrogen sulfide and other organic sulfur compounds. The "purified" COG is then used as fuel at a number of the facility's combustion units. The COG is also combusted along with natural gas to provide heat at the coke oven batteries.

Once the coking process has been completed, doors along the side of the ovens are opened and the coke is pushed from the ovens into a quench car. The coke is then transported to one of five quench towers, where water is sprayed onto the coke in order to cool it and prevent it from re-igniting.

Sinter Production

The Gary Works facility operates one Sinter plant that has three Sinter Strands. Sinter is an agglomerated material produced by the heating of fine-sized raw materials (i.e., iron ore, limestone, flue dust, coke, etc.) that is subsequently processed for use at blast furnaces to produce iron. The raw materials are conveyed into a burner hood by a traveling grate system called a Sinter Strand. The sinter is ignited at the burner and the material is melted to an agglomeration that is cooled, crushed, and screened for use at the blast furnaces.

Iron Production

Iron is produced by exposing iron bearing materials (i.e., iron ore, sinter, etc.) to hot gas in a refractory-lined unit called a blast furnace. The raw materials, flux (i.e., limestone) and coke (fuel), are charged at the top of the blast furnace and react to produce molten iron and slag at the

base of the furnace. Gases produced in the blast furnace are collected and used as fuel at various on-site processes. There are four blast furnaces at the USS Gary Works facility [two 200 ton per hour (ton/hr), one 183 ton/hr, and one 450 ton/hr furnaces].

The molten iron and slag are periodically removed, or cast, from the blast furnace by tapping a hole at the base of the furnace hearth and allowing it to drain into runners that lead to transport ladles. The slag is directed via separate runners to a slag pit near the casthouse. There are four slag pits, one per blast furnace, at the Gary Works facility.

Steelmaking Process

A significant portion of the sulfur contained in the molten iron is removed by adding reagents. The subsequent reaction produces slag that floats to the top of the molten iron and is skimmed off. The molten iron is then charged to a Basic Oxygen Process (BOP) furnace where it is injected, or lanced, with high-purity oxygen. The oxygen exothermically reacts with impurities in the iron to produce slag. When the process is complete, the furnace is tapped and the slag is removed. The Gary Works facility has four hot metal transfer and desulfurization stations and six BOP furnace vessels rated at 250 tons/hr each.

The steel is then finished as hot rolled, cold rolled, and galvanized sheet products for the automotive, metal building components, construction, and appliance markets.

2.) Media-Specific Information

Clean Air Act

The U.S. Steel facility is located in Lake County, Indiana, which is designated as "non-attainment" for both the 8-hour average ozone standard and the $PM_{2.5}$ standard. Lake County is designated as "attainment" or "unclassifiable" for the remaining criteria pollutants.

A Part 70 Operating Permit (Title V permit) was issued to U.S. Steel by the Indiana Department of Environmental Management (IDEM), Office of Air Quality, on August 16, 2006. This operating permit contains the conditions regulating the permitted sources of air emissions at the U.S. Steel Gary, Indiana, integrated steel mill. The significant emission sources contained in this permit include four blast furnaces, three top-down BOP steelmaking furnaces, three bottom-blown (Q-BOP) steelmaking furnaces, a vacuum degasser four continuous casting lines, four coke oven batteries, two coke battery precarbonization facilities, one coal crusher, one petcoke crusher, a coke by-products recovery plant, a coke oven gas (COG) desulfurization facility, 11 coke plant boilers, a sinter plant, two continuous pickle lines, two sheet mills, two annealing lines, five annealing furnaces, three boiler house boilers, and six turboblower boiler house boilers. A comprehensive listing of the permitted emission units can be found in the facility's Title V permit.

Potentially applicable federal air emissions control regulations pertaining to emission sources at the facility include, but may not be limited to:

- 40 CFR Part 60, Subparts A [New Source Performance Standards (NSPS) General Provisions];
- 40 CFR Part 60, Subpart Y (Opacity Limitations Coal Preparation Plant);
- 40 CFR Part 63, Subpart A [National Emission Standards for Hazardous Air Pollutants (NESHAP) General Provisions];
- 40 CFR Part 63, Subpart L (NESHAP for Coke Oven Batteries);
- 40 CFR Part 63, Subpart CCCCC (NESHAP for Coke Ovens: Pushing, Quenching, and Battery Stacks);
- 40 CFR Part 61, Subpart A (General Provisions Relating to NESHAP);
- 40 CFR Part 61, Subpart L (National Emission Standard for Benzene Emissions from Coke By-product Recovery Plants);
- 40 CFR Part 61, Subpart V [National Emission Standard for Equipment Leaks (Fugitive Emission Sources)];
- 40 CFR Part 61, Subpart FF (National Emission Standard for Benzene Waste Operations);
- 40 CFR Part 63, Subpart DDDDD (NESHAP for Industrial, Commercial, Institutional Boilers and Process Heaters);
- 40 CFR Part 60, Subpart Db (NSPS for Industrial-Commercial-Institutional Steam Generating Units);
- 40 CFR Part 60, Subpart Dc (NSPS for Small Industrial-Commercial-Institutional Steam Generating Units);
- 40 CFR Part 60, Subpart D (NSPS for Fossil-Fuel-Fired Steam Generators for Which Construction is Commenced After August 17, 1971);
- 40 CFR Part 63, Subpart FFFFF (NESHAP for Integrated Iron and Steel Manufacturing Facilities); and
- 40 CFR Part 63, Subpart CCC (NESHAP for Steel Pickling – HCl Process Facilities and Hydrochloric Acid Regeneration Plants).

IDEM routinely conducts on-site CAA related inspections at the Gary Works facility. IDEM conducted the most recent CAA inspection at the plant on February 15, 2007. IDEM has taken three formal enforcement actions against the facility within the last 5 years. Penalties for these

violations totaled $571,400. As of March 10, 2007, the facility is listed on the High Priority Violators list for 12 quarters of "unaddressed" violations (i.e., no formal enforcement actions have been initiated).

EPA conducted its most recent on-site compliance inspections on October 2 and June 4, 2002. A Notice of Violation (NOV) was issued to the facility on March 6, 2003, regarding alleged violations at Gary Works hot metal desulfurization facilities. A Finding of Violation (FOV) was issued to the facility on July 18, 2002, related to violations of performance testing standards at the facility's coke oven batteries.

Resource Conservation and Recovery Act - Hazardous Waste

The Gary Works facility is a large quantity generator with a RCRA hazardous waste with the identification number IND005444062.

The 2005 Toxic Release Inventory database indicates that the US Steel Gary Works facility generated, managed, and shipped, 42,576 tons of hazardous waste. Of this quantity of waste, 327 tons were transferred off-site for further waste management.

EPA has conducted no on-site RCRA compliance evaluation inspections in the past 5 years. EPA has taken no formal RCRA enforcement actions within the last five (5) years.

IDEM has conducted eight on-site RCRA compliance evaluations within the past 5 years. The most recent on-site inspections occurred on December 9, 2006, September 7, 2006, December 15, 2005, and September 14, 2005. The facility is not currently on the High Priority Violators list for RCRA. There have been two formal RCRA enforcement actions taken by IDEM within the past 5 years. IDEM issued a final Compliance Order on December 12, 2003, with a assessed penalty of $9,400. IDEM has issued five written informal violations to the Gary Works facility within the past five years.

Clean Water Act

The Gary Works facility has a large number of process and cooling water outfalls which discharge to Lake Michigan, the Grand Calumet River, and Stockton Pond. These discharges are limited by 40 CFR Parts 420 and 433, IDEM ambient water quality standards, and a Consent Decree resulting from a CWA enforcement action.

EPA has conducted one reconnaissance, on March 27, 2003, and two non-sampling CWA compliance evaluations, on July, 23, 2004, and June 2, 2005, for the Gary Works plant during the last 5 years.

IDEM has conducted nine CWA reconnaissances and three non-sampling CWA compliance evaluations for Gary Works within the past 5 years. The most recent reconnaissance was conducted on December 2, 2005. The facility is not currently on the High Priority Violators list for CWA. There have been no formal CWA National Pollutant Discharge Elimination System (NPDES) enforcement actions taken by IDEM or EPA within the past 5 years.

3.) Accidental Releases

A review of the National Response Center data base shows that there have been 45 reported releases for Gary Works over the past five years. Releases during the past two years involved the following:

Date	Media	Description of Event
8/7/2006	Water	Hydraulic fluid discharged out of outfall O35 into Lake Michigan due to a broken hydraulic line on No. 4 Blast Furnace
5/21/2006	Land	Release of approximately 2 gallons of KO62 spent pickle liquor from a tanker truck due to a valve that was left partially open.
4/26/2006	Air	Release of coke of gas due to a gas booster trip.
12/19/2005	Air	Release of coke oven gas from center flare stack on Battery No. 2.
10/31/2005	Land	A Pipeline attached to a storage tank ruptured and spilled about 500 gallons of tar.
7/19/2005	Land	A clog on a drum screen caused a release of materials (ammonia, benzene, cyanide, flushing liquor, phenol) into the secondary containment and then onto the ground.
6/28/2005	Water	Release of hydraulic oil from the Hot Strip Mill to outfall 039 into Lake Michigan due to unknown cause.
6/10/2005	Air	Release of raw coke oven gas due to operator error. COG released to the flare stack.
6/8/2005	Land	Release of about 2 gallons of transformer oil (PCB) from pad mounted transformer due to equipment failure (possible leak).
5/9/2005	Land	Release about 110 gallons of flushing tar due to a failure in a pipe.
5/5/2005	Water	Oil coming out of an outfall from an unknown source. Released to Grand Calumet River.

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APPENDIX A

Clean Air Act Inspection Reports

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APPENDIX B

Resource Conservation and Recovery Act Inspection Reports

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APPENDIX C

Toxic Substance Control Act Inspection Report

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APPENDIX D

Clean Water Act Inspection Report